

What is claimed is:

1. A spinal fixation system, comprising:
a plate for stabilizing a spine, the plate comprising a borehole;
5 a bone screw comprising a head and a shank;
a ring for inhibiting backout of the bone screw from the plate, the ring being
positionable within the borehole between the plate and the bone screw during use, and
wherein the ring allows the bone screw to be inserted into a bone at a desired angle
relative to the plate;
10 and wherein the head and the ring are configured to couple together without
fixedly engaging the ring to the plate during use.
2. The system of claim 1, wherein the ring is configured to substantially surround the
head during use, and wherein rotating the bone screw rotates the ring when the ring and
15 bone screw are coupled together.
3. The system of claim 1, wherein the head comprises an outer threaded surface and
the ring comprises an inner threaded surface, wherein the head threading is
complementary to the ring threading.
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4. The system of claim 1, wherein the ring is movable within the borehole such that
the shank is rotatable in a substantially conical range of motion to allow the shank to be
positioned at a selected angle relative to the plate.
- 25 5. The system of claim 3, wherein the ring threading has multiple starts to facilitate
connection of the bone screw and the ring during use.
6. The system of claim 3, wherein the ring threading has a double start to facilitate
connection of the bone screw and the ring during use.
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7. The system of claim 3, wherein the ring threading has a triple start to facilitate connection of the bone screw and the ring during use.

8. The system of claim 3, wherein the shank comprises bone threading having a first pitch, and wherein the ring threading comprises a second pitch, the second pitch being substantially equal to the first pitch.

9. The system of claim 3, wherein the shank comprises bone threading having a first pitch, and wherein the ring threading comprises a second pitch, the second pitch being substantially equal to the first pitch, and wherein the pitch is predetermined to allow the plate to contact the bone when the bone screw is inserted within the bone and coupled to the ring.

10. The system of claim 1, wherein the ring comprises one or more slots to allow it to expand.

11. The system of claim 1, wherein the ring comprises one or more slots to allow it to contract.

12. The system of claim 1, wherein the borehole comprises an inner surface and a width across the borehole, the inner surface being curved such that the width varies in a direction axially along the borehole.

13. The system of claim 1, wherein the borehole comprises a substantially curvate inner surface, and wherein the ring further comprises a substantially curvate outer surface, the curvate outer surface being shaped to allow the ring to swivel within the borehole.

14. The system of claim 1, wherein the plate comprises an upper surface and lower surface, and wherein the ring comprises an outer surface and an outer ring width, and wherein the borehole comprises a substantially curvate inner surface and a width defined

across the inner surface, the width of the borehole varying in a direction axially along the borehole, and wherein the width of the borehole is greater than about the outer ring width at a location between the upper and lower surface, and wherein the width of the borehole is not greater than the outer ring width proximate the upper and lower surfaces.

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15. The system of claim 1, wherein the plate comprises an upper surface and a lower surface, and wherein the borehole extends between the upper and lower surfaces, the borehole comprising a width that varies in a direction axially along the borehole, and wherein the ring is disposed within the borehole, the ring further comprising an outer ring width that is greater than about the width of the borehole proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the borehole proximate the upper and lower surfaces to substantially inhibit the ring from being removed from the borehole.

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16. The system of claim 1, wherein the ring is configured to reside within the borehole without extending above an upper surface of the plate during use.

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17. The system of claim 1, wherein the ring substantially surrounds the head of the bone screw, and wherein the bone screw is capable of being angulated relative to the plate during use such that the head remains below the upper surface of the plate.

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18. The system of claim 1, wherein the plate comprises a second borehole, and the system further comprises:

a second bone screw comprising a second head and a second shank, the head of the second bone screw comprising threading;

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a second ring for coupling the second bone screw to the plate, the second ring being positionable within the second borehole between the plate and the second bone screw during use, the second ring comprising second ring threading for engaging the threading on the head of the second bone screw during use;

and wherein the shanks of the first bone screw and the second bone screw are positionable to extend into the bone in substantially converging or substantially diverging directions relative to one another during use.

5 19. The system of claim 18, wherein the first shank is positioned at a first oblique angle relative to the plate during use, and wherein the second shank is positioned at a second oblique angle relative to the plate during use, and wherein the first shank and the second shank extend in diverging directions relative to each other during use.

10 20. The system of claim 18, wherein the first shank is positioned at a first oblique angle relative to the plate during use, and wherein the second shank is positioned at a second oblique angle relative to the plate during use, and wherein the first shank and the second shank extend in converging directions relative to each other during use.

15 21. The system of claim 1, wherein the ring is rotatable within the borehole so that the shank is positionable through the ring at a selectable angle that is less than about 15 degrees relative to a plane substantially perpendicular to the plate.

20 22. The system of claim 1, wherein the ring comprises a plurality of slots extending from a bottom and a top of the ring to a middle portion of the ring.

23. A method for stabilizing a spine, comprising:
positioning a plate adjacent to a bone, the plate comprising a borehole;
moving a shank of a bone screw into a ring positioned within the borehole, the
25 bone screw comprising a head having an outer surface with head threading disposed thereon, the ring comprising a substantially curvate outer surface and an inner surface having ring threading disposed thereon that mates with the head threading, the borehole comprising a substantially curvate inner surface;
angulating the bone screw by swiveling the outer surface of the ring across the
30 inner surface of the borehole to position the bone screw;

engaging the ring threading with the head threading to couple the ring to the bone screw; and

advancing the bone screw into the bone to connect the plate to the bone;

wherein the coupled ring and bone screw are configured to move within the borehole without the ring fixedly engaging the plate during use.

24. The method of claim 23, wherein the bone screw is fixed in a position whereby it extends from the plate at a substantially oblique angle.

25. The method of claim 23, wherein the ring comprises one or more slots, and wherein the slot is widened when the head is moved through the ring.

26. The method of claim 23, further comprising drilling and/or tapping an opening into the bone that is shaped to receive the bone screw prior to advancing the bone screw into the bone.

27. The method of claim 23, further comprising screwing a second bone screw into the bone, the second bone screw extending through a second borehole in the plate such that the two bone screws extend in diverging directions relative to each other.

28. The method of claim 23, further comprising screwing a second bone screw into the bone, the second bone screw extending through a second borehole in the plate such that the two bone screws extend in converging directions relative to each other.

29. The method of claim 23, wherein the ring is movable within the borehole so that the shank of the bone screw that is positioned within the ring before the bone screw is advanced into the bone is rotatable in a substantially conical range of motion relative to the plate.

30. The method of claim 23, wherein the ring threading has multiple starts to facilitate engagement of the ring threading with the head threading.

31. The method of claim 23, further comprising manually inserting the ring within the borehole prior to moving the bone screw through the ring.

32. The method of claim 23, wherein the borehole is shaped to substantially inhibit the ring from being removed from the borehole, and further comprising swiveling the ring about the borehole to position the bone screw.

33. The method of claim 23, wherein the ring does not extend from the borehole beyond a surface of the plate after bone screw is advanced into the bone.

34. The method of claim 23, wherein the ring is movable within the borehole such that the shank of the bone screw is positionable within the ring in a substantially conical range of motion to allow the shank to be positioned at a selected angle of less than about 15 degrees relative to a plane substantially perpendicular to the plate.

35. A spinal fixation system, comprising:
a plate for stabilizing a spine, the plate comprising a borehole;
a ring positionable within the borehole, the ring having an inner surface; and
a bone screw comprising a head and a shank, the head having a roughened, non-threaded, outer surface that frictionally couples the head to the inner surface of the ring;
and

wherein the ring allows the bone screw to be inserted into a bone at a desired angle relative to the plate, and wherein movement of the bone screw with respect to the ring is substantially inhibited during use.

36. A spinal fixation system, comprising:

a plate for stabilizing a spine, the plate comprising a borehole, the borehole comprising a substantially curvate inner surface;

a bone screw for coupling the plate to a bone, the bone screw comprising a head, the head comprising threading and being positionable within the borehole during use; and

5 a ring for inhibiting backout of the bone screw from the plate, the ring being positionable within the borehole between the plate and the head during use, the ring comprising a substantially curvate outer surface and an inner surface having ring threading disposed thereon for engaging the threading on the head during use;

10 wherein the threading of the head couples the ring to the bone screw, and wherein the coupled head and ring are configured to allow advancement of a shank of the bone screw into the bone without fixedly coupling the ring to the plate during use.

37. A spinal fixation system, comprising:

a plate for stabilizing a spine, the plate comprising a borehole;

15 a bone screw comprising a head and a shank for coupling the plate to a bone; and

a ring comprising a non-threaded inner surface, the ring configured to couple the bone screw to the plate, wherein the ring is positionable within the borehole between the plate and the bone screw during use;

20 wherein the inner surface of the ring is roughened to promote frictional engagement between the ring and the head, and wherein movement of the bone screw with respect to the ring is substantially inhibited during use.

38. The system of claim 37, wherein the ring is configured to substantially surround the head during use, and wherein rotating the bone screw rotates the ring when the ring and bone screw are frictionally engaged.

39. The system of claim 37, wherein the ring is movable within the borehole such that the shank is rotatable in a substantially conical range of motion to allow the shank to be positioned at a selected angle relative to the plate.

40. The system of claim 37, wherein the ring comprises one or more slots to allow it to expand.

41. The system of claim 37, wherein the ring comprises one or more slots to allow it to contract.

42. The system of claim 37, wherein the borehole comprises an inner surface and a width across the borehole, the inner surface being curved such that the width varies in a direction axially along the borehole.

43. The system of claim 37, wherein the borehole comprises a substantially curvate inner surface, and wherein the ring further comprises a substantially curvate outer surface, the curvate outer surface being shaped to allow the ring to swivel within the borehole.

44. The system of claim 37, wherein the plate comprises an upper surface and lower surface, and wherein the ring comprises an outer surface and an outer ring width, and wherein the borehole comprises a substantially curvate inner surface and a width defined across the inner surface, the width of the borehole varying in a direction axially along the borehole, and wherein the width of the borehole is greater than about the outer ring width at a location between the upper and lower surface, and wherein the width of the borehole is not greater than the outer ring width proximate the upper and lower surfaces.

45. The system of claim 37, wherein the plate comprises an upper surface and a lower surface, and wherein the borehole extends between the upper and lower surfaces, the borehole comprising a width that varies in a direction axially along the borehole, and wherein the ring is disposed within the borehole, the ring further comprising an outer ring width that is greater than about the width of the borehole proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the borehole proximate the upper and lower surfaces to substantially inhibit the ring from being removed from the borehole.

46. The system of claim 37, wherein the ring is configured to reside within the borehole without extending above an upper surface of the plate during use.

47. The system of claim 1, wherein the ring substantially surrounds the head of the bone screw, and wherein the bone screw is capable of being angulated relative to the plate during use such that the head remains below the upper surface of the plate.

48. The system of claim 37, wherein the outer surface of the head is roughened.

49. A spinal fixation system, comprising:

a plate for stabilizing a spine, the plate comprising a first pair of boreholes, a second pair of boreholes, and a midline borehole, the midline borehole positioned between the first and the second pairs of boreholes;

a plurality of bone screws, each of the bone screws comprising a head and a shank for coupling a portion of the plate to bone, the heads of the bone screws comprising threading; and

a plurality of rings for inhibiting backout of the bone screws from the plate, each of the rings being positionable within one of the boreholes between the plate and one of the bone screws during use, wherein each of the rings comprises ring threading for engaging head threading of the bone screws during use;

wherein the rings allow the bone screws to be inserted into bone at desired angles relative to the plate;

wherein the head threading of the bone screws couples the rings to the bone screws; and

wherein the coupled heads and rings are configured to allow advancement of the shanks without the rings fixedly engaging the bone screws to the plate during use.

50. A spinal fixation plate, comprising:

a borehole extending between an upper surface and a lower surface of the plate, the borehole comprising a width that varies in a direction axially along the borehole; and

a ring disposed within the borehole, the ring further comprising a roughened, non-threaded, inner surface and an outer ring width that is greater than about the width of the borehole proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the borehole proximate the upper and lower surfaces to substantially inhibit the ring from being removed from the borehole, wherein the roughened inner surface of the ring is configured to engage an outer surface of a head of a bone screw, and wherein the ring is configured to allow the bone screw to be angularly inserted into a bone relative to the plate.

51. The plate of claim 50, wherein the ring is configured to substantially surround the head during use, and wherein rotating the bone screw rotates the ring when the ring and bone screw are engaged.

52. The plate of claim 50, wherein the ring comprises a slot to allow it to contract.

53. The plate of claim 50, wherein the ring comprises a plurality of partial slots extending from top and bottom surfaces of the ring.

54. The system of claim 50, wherein the borehole comprises a substantially curvate inner surface, and wherein the ring further comprises a substantially curvate outer surface, the curvate outer surface being shaped to allow the ring to swivel within the borehole.

55. The plate of claim 50, wherein the ring is configured to reside within the borehole without extending above an upper surface of the plate during use.

56. The system of claim 35, wherein the ring is configured to substantially surround the head during use, and wherein rotating the bone screw rotates the ring when the ring and bone screw are frictionally coupled together.

57. The system of claim 35, wherein the outer surface of the head further comprises head threading, the head threading being complementary to ring threading on the inner surface of the ring.

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58. The system of claim 35, wherein the ring is movable within the borehole such that the shank is rotatable in a substantially conical range of motion to allow the shank to be positioned at a selected angle relative to the plate.

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59. The system of claim 57, wherein the ring threading has multiple starts to facilitate connection of the bone screw and the ring during use.

60. The system of claim 57, wherein the ring threading has a double start to facilitate connection of the bone screw and the ring during use.

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61. The system of claim 57, wherein the ring threading has a triple start to facilitate connection of the bone screw and the ring during use.

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62. The system of claim 57, wherein the shank comprises bone threading having a first pitch, and wherein the ring threading comprises a second pitch, the second pitch being substantially equal to the first pitch.

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63. The system of claim 57, wherein the shank comprises bone threading having a first pitch, and wherein the ring threading comprises a second pitch, the second pitch being substantially equal to the first pitch, and wherein the pitch is predetermined to allow the plate to contact the bone when the bone screw is inserted within the bone and coupled to the ring.

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64. The system of claim 35, wherein the ring comprises one or more slots to allow it to expand.

65. The system of claim 35, wherein the ring comprises one or more slots to allow it to contract.

5 66. The system of claim 35, wherein the borehole comprises an inner surface and a width across the borehole, the inner surface being curved such that the width varies in a direction axially along the borehole.

67. The system of claim 1, wherein the borehole comprises a substantially curvate
10 inner surface, and wherein the ring further comprises a substantially curvate outer surface, the curvate outer surface being shaped to allow the ring to swivel within the borehole.

68. The system of claim 35, wherein the ring substantially surrounds the head of the
15 bone screw, and wherein the bone screw is capable of being angulated relative to the plate during use such that the head remains below the upper surface of the plate.

69. The system of claim 35, wherein the plate comprises a second borehole, and the system further comprises:

20 a second bone screw comprising a second head and a second shank the second head having a roughened outer surface; and

a second ring for coupling the second bone screw to the plate, the second ring being positionable within the second borehole between the plate and the second bone screw during use.

25 70. The system of claim 35, wherein the ring is rotatable within the borehole so that the shank is positionable through the ring at a selectable angle that is less than about 15 degrees relative to a plane substantially perpendicular to the plate.

71. The system of claim 35, wherein the ring comprises a plurality of slots extending
30 from a bottom and a top of the ring to a middle portion of the ring.

72. The plate of claim 50, further comprising ring threading on the inner surface of the ring, wherein the ring threading has multiple starts to facilitate connection of the bone screw and the ring during use.

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73. The plate of claim 50, further comprising ring threading on the inner surface of the ring, wherein the ring threading has a double start to facilitate connection of the bone screw and the ring during use.

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74. The plate of claim 50, further comprising ring threading on the inner surface of the ring, wherein the ring threading has a triple start to facilitate connection of the bone screw and the ring during use.

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75. The plate of claim 50, wherein the ring is configured to reside within the borehole without extending above an upper surface of the plate during use.

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76. The plate of claim 50, wherein the plate further comprises:

additional boreholes extending between the upper and lower surface of the plate, each additional borehole comprising a variable width; and

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additional rings disposed within each of the additional boreholes, each additional ring comprising a roughened inner surface and an outer ring width that is greater than about the width of the additional boreholes proximate the upper and lower surfaces, the additional rings outer ring width being sized relative to the width of the additional boreholes proximate the upper and lower surfaces to substantially inhibit the additional rings from being removed from the additional boreholes, and wherein the roughened inner surface of each additional ring is configured to engage an outer surface of a head of a bone screw, and wherein the rings are configured to allow the bone screws to be angularly inserted into bone relative to the plate.

77. The system of claim 76, wherein the ring further comprises threading, wherein the head further comprises threading, and wherein the ring threading mates with the head threading to couple the ring to the head.

5 78. The system of claim 76, wherein the ring further comprises a roughened inner surface configured to couple the head to the plate.

79. The system of claim 76, wherein the head further comprises a roughened outer surface configured to couple to an inner surface of the ring.

10 80. The system of claim 23, wherein the bone screw and the ring rotate together within the borehole when the ring threading and the head threading are engaged together during use.

15 81. The system of claim 35, wherein the inner surface of the ring is roughened to engage the roughening of the head.

20 82. The system of claim 36, wherein the ring is configured to substantially surround the head during use, and wherein rotating the bone screw rotates the ring when the ring and bone screw are coupled together.

83. The system of claim 36, wherein the ring threading has multiple starts to facilitate connection of the bone screw and the ring during use.

25 84. The system of claim 36, wherein the ring threading has a double start to facilitate connection of the bone screw and the ring during use.

85. The system of claim 36, wherein the ring threading has a triple start to facilitate connection of the bone screw and the ring during use.

86. The system of claim 36, wherein the ring is configured to reside within the borehole without extending above the upper surface of the plate during use.

87. The system of claim 36, wherein the plate comprises an upper surface and lower surface, and wherein the borehole extends between the upper and lower surfaces, the borehole comprising a width that varies in a direction axially along the borehole, and wherein the ring is disposed within the borehole, the ring further comprising an outer ring width that is greater than about the width of the borehole proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the borehole proximate the upper and lower surfaces to substantially inhibit the ring from being removed from the borehole.

88. The system of 49, wherein each of the rings are configured to substantially surround the heads of the bone screws during use.

89. The system of 49, wherein the threading of each ring has multiple starts to facilitate connection of the bone screws and the rings during use.

90. The system of 49, wherein the threading of each ring has a double start to facilitate connection of the bone screws and the rings during use.

91. The system of 49, wherein the threading of each ring has a triple start to facilitate connection of the bone screws and the rings during use.

92. The system of 49, wherein each of the rings are configured to reside within the boreholes without extending above an upper surface of the plate during use.

93. The system of 49, wherein each of the boreholes comprises a substantially curvate inner surface, and wherein each of the rings further comprises a substantially curvate

outer surface, the curvate outer surface being shaped to allow each of the rings to swivel within each of the boreholes.

94. The system of 49, wherein the plate comprises an upper surface and a lower surface, and wherein the boreholes extend between the upper and lower surfaces, and each borehole comprising a width that varies in a direction axially along the borehole, and wherein each of the rings is disposed within the boreholes, the rings further comprising an outer ring width that is greater than about the width of the boreholes proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the borehole proximate the upper and lower surfaces to substantially inhibit each of the rings from being removed from each borehole.

95. The system of claim 35, wherein the ring is configured to substantially surround the head during use, and wherein rotating the bone screw rotates the ring when the ring and bone screw are frictionally coupled.

96. A bone plate system comprising:
a plate;
an opening passing through the plate wherein a portion of the plate forms a wall of the opening;
a fastener configured to couple the plate to a bone;
a ring surrounding at least a portion of the fastener during use;
wherein the wall of the opening is configured to inhibit backout of the ring from the plate; and
wherein the fastener and the ring are configured to couple together without fixedly engaging the ring to the plate during use.

97. The system of claim 96, wherein the ring comprises one or more slots to allow the ring to expand.

98. The system of claim 96, wherein the fastener comprises a bone screw.

99. The system of claim 96, wherein the plate comprises an upper surface and lower surface, and wherein the ring comprises an outer surface and an outer ring width, and wherein the opening comprises an inner surface and an inner ring width defined across the inner surface, the width of the opening varying in a direction axially along the opening, and wherein the width of the opening is greater than the outer ring width at a location between the upper and lower surface, and wherein the width of the opening is not greater than the outer ring width proximate the upper and lower surfaces.

100. The system of claim 96, wherein the plate comprises an upper surface and a lower surface, and wherein the opening extends between the upper and lower surfaces, the opening comprising a width that varies in a direction axially along the opening, and wherein the ring is disposed within the opening, the ring further comprising an outer ring width that is greater than about the width of the opening proximate the upper and lower surfaces, the outer ring width being sized relative to the width of the opening proximate the upper and lower surfaces to substantially inhibit the ring from being removed from the opening.

101. The system of claim 96, wherein the fastener is capable of being angulated relative to the plate during use such that an edge of a head of the fastener remains below an upper surface of the plate.

102. The system of claim 96, wherein a first surface of the plate is configured to be positioned adjacent to vertebrae, and wherein the first surface has a non-planar contour that more closely conforms to a shape of vertebral surfaces than does a plate having a planar contour.

103. The system of claim 96, wherein the plate comprises a second opening, and the system further comprises:

a second fastener;

a second ring for coupling the second fastener to the plate, the second ring being positionable within the second opening between the plate and the second fastener during use; and

5 wherein the first fastener and the second fastener are positionable to extend into the bone in substantially converging or substantially diverging directions relative to one another during use.

10 104. The system of claim 96, wherein the fastener comprises a head and a shank, wherein the shank comprises bone threading having a first pitch, and wherein the ring comprises threading comprising a second pitch, the second pitch being substantially equal to the first pitch, and wherein the pitch is predetermined to allow the plate to contact the bone when the fastener is inserted within the bone and coupled to the ring.

15 105. The system of claim 96, wherein the ring further comprises a roughened inner surface configured to couple the bone screw to the plate.

20 106. A bone plate system for joining vertebrae comprising:
 a plate having a first opening through the plate and a fastener opening through the plate, wherein a portion of the plate forms a wall of the fastener opening;
 a ring disposed within the fastener opening;
 a bone screw comprising a head and a shank; and
 wherein an inner surface of the ring is configured to engage the head such that the ring inhibits backout of the bone screw from the fastener opening; and
 wherein the head and the ring are configured to couple together without fixedly
 25 engaging the ring to the plate during use.

30 107. The system of claim 106, wherein an outer surface of the ring is configured to engage the wall of the fastener opening.

108. The system of claim 106, wherein the ring is configured to move within the plate to allow a shank of the fastener to be inserted into bone at an oblique angle to the plate.

109. The system of claim 106, wherein a first surface of the plate is configured to be positioned adjacent to vertebrae, and wherein the first surface has a non-planar contour that more closely conforms to a shape of vertebral surfaces than does a plate having a planar contour.

110. The system of claim 106, further comprising a bone graft screw and wherein the bone graft screw is configured to pass into the first opening to couple bone graft to the plate.

111. A bone plate system comprising:

a plate comprising a first opening and a second opening;

a first ring placed in the first opening;

a first bone screw configured to be placed into the first opening to couple the plate to a first bone portion, wherein a head of the first bone screw couples to the first ring and wherein the first ring inhibits removal of the first bone screw from the first opening without the first ring becoming fixedly engaged to the plate;

a second bone screw configured to be placed into the second opening to couple the plate to a second bone portion; and

wherein the first opening is configured to allow the first ring to be positionable within the first opening so that the first bone screw is at an angle less than about 40° relative to a longitudinal axis of the first opening when the bone screw is placed in the first bone portion.

112. The system of claim 111, further comprising a second ring placed in the second opening, wherein a head of the second bone screw couples to the second ring, wherein the second ring inhibits removal of the second bone screw from the second opening, and wherein the second opening is configured to allow the second ring to be positionable with

the second opening so that the second bone screw is at an angle less than about 40° relative to a longitudinal axis of the second opening when the bone screw is placed in the second bone portion.

113. The system of claim 111, wherein the plate comprises a third opening.

114. The system of claim 111, wherein the plate comprises a third opening, and further comprising a screw, wherein a first portion of the screw is configured to pass through the third opening and wherein a second portion of the screw is configured to inhibit passage of the screw through the third opening so that the screw is able to couple bone graft to the plate.

115. The system of claim 111, wherein the first ring comprises a roughened surface configured to enhance a frictional connection between the first ring and the first bone screw.

116. A spinal fixation kit comprising:
a plate comprising openings for fasteners that fasten the plate to bone;
a plurality of fasteners configured to affix the plate to bone portions; and
a plurality of rings wherein a ring of the plurality of rings is configured to engage a head of a fastener of the plurality of fasteners so that the ring and fastener combination couples the plate to a bone portion and so that the ring and fastener combination inhibits removal of the bone screw from the plate without the ring fixedly engaging the plate.

117. The kit of claim 116, further comprising an insertion tool configured to insert a fastener of the plurality of fasteners into a bone portion.

118. The kit of claim 116, further comprising at least one screw, wherein the screw is configured to couple bone graft to the plate.

119. The kit of claim 116, wherein the at least one ring of the plurality of rings is positioned in an opening of the plate.

120. The kit of claim 116, wherein a first surface of the plate is configured to be positioned adjacent to vertebrae, and wherein the first surface has a non-planar contour that more closely conforms to a shape of vertebral surfaces than does a plate having a planar contour.

121. A method of making a plate system configured to stabilize a spine, comprising:
providing a plate sized to couple portions of a spine together, the plate comprising openings positionable over portions of the spine;

placing rings within the openings;

providing a plurality of bone screws, wherein a head of a bone screw is configured to engage a ring positioned in an opening in the plate to form a bone screw and ring combination, and wherein a bone screw and ring combination inhibits removal of the bone screw from the plate.

122. The method of claim 121, further comprising conforming the plate to approximate a curvature of vertebral surfaces.

123. The method of claim 121, wherein the plate comprises a connector opening, and further comprising providing a screw having a first portion sized to inhibit passage through the connector opening and a second portion, wherein the second portion of the screw is positionable through the opening and into bone graft to couple the bone graft to the plate.